A NONINCREMENTAL AND MULTISCALE COMPUTATIONAL STRATEGY FOR MULTIPHYSICS PROBLEMS

D. Néron[a], **D. Dureisseix**[b], **P. Ladevèze**[a] and **B. A. Schrefler**[c]

[b]LMT Cachan (ENS Cachan/CNRS/University Paris 6)
61, avenue du Président Wilson, F-94235 Cachan cedex, France
{neron,ladeveze}@lmt.ens-cachan.fr

[a]LMGC (University Montpellier 2/CNRS)
CC 048, place Eugène Bataillon, F-34095 Montpellier cedex 5, France
dureisse@lmgc.univ-montp2.fr

[c]Department of Structural and Transportation Engineering (University of Padova)
Via Marzolo 9, I-35131 Padova, Italy
bas@caronte.dic.unipd.it

Usually, multiphysics phenomena and coupled-field problems lead to computationally intensive structural analysis. Strategies to keep these problems computationally affordable are of special interest. For coupled fluid-structure problems, for instance, partitioned procedures and staggered algorithms [1,2] are often preferred to direct analysis (also called the monolithic approach), from a computational efficiency point of view.

Recently, a nonincremental strategy derived from the LArge Time INcrement (LATIN [3]) method has been described and successfully applied to the consolidation of saturated porous soils, which is a highly coupled fluid-solid problem [4]. The method is based on the generalization of the concept of geometric interfaces between substructures to an interface between different physics.

Another step has been the use of the LATIN method to take into account the different time scales which usually arise from the different physics: a multi-time-scale strategy has been proposed and has improved the existing method [5].

Here, an *ad hoc* radial loading approximation of all unknowns is set up and increases the efficiency of the approach significantly, especially from the modularity point of view. The LATIN method is compared with the ISPP (one standard partitioning scheme).

References

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